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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,340	03/31/2004	Jeffrey Bogart	ASMNUT.002A	8833

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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 06/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/816,340	BOGART ET AL.	
	Examiner	Art Unit	
	Harry D. Wilkins, III	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) 1-30 and 45-58 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 31-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/10/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. This application is a continuation-in -part of application 10/152,793 which is a divisional of application 09/511,278. This application also claims priority to provisional application 60/462,919. This application recites subject matter not supported by the parent application, namely (1) that the pad is configured to bow and apply more pressure near the center of the wafer surface than the rest of the surface as the pressure of a solution increases and (2) extendable side walls of the chamber which push the polishing surface against the wafer surface as the pressure of a fluid increases. Each of these features is given the effective filing date of 14 April 2003, which is the filing date of 60/462,919. The additional subject matter of the claims finds support in the parent applications and is thus given the effective filing date of 23 February 2000 (the filing date of 09/511,278) with the exception of the porous membrane placed under the pad. The porous membrane is not supported by the parent applications and is given an effective filing date of 14 April 2003.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 35 and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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4. Claim 35 recites the limitation "the process" in line 2 twice. The first instance does not grammatically agree with the rest of the claim. It appears that the first instance should be "the process solution".

5. Claim 36 recites the limitation "the pressure sensor" in line 1. There is insufficient antecedent basis for this limitation in the claim. It appears that claim 36 should depend from claim 35.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 31 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Nagahara et al (US 5,931,719).

Nagahara anticipates the invention as claimed. Nagahara teaches (see figures 2A, 3A and 5 and related descriptions) an apparatus including a wafer carrier holding a wafer, a chamber having an upper opening and a compressible and flexible pad x08 having a polishing surface x04 and fluid channels x06 and x09, wherein the pad is placed between the upper opening of the chamber and the wafer, wherein the pad is

configured to bow outward and therefore apply more pressure at the center when a pressure in the chamber increases.

Regarding claim 32, there is a perforated and flexible support plate 10 placed under the pad.

8. Claims 31 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Nagahara et al (US 5,816,900).

Nagahara et al anticipates the invention as claimed. Nagahara et al teach (see figure 2 and col. 4, line 60 to col. 5, line 40) an apparatus including a wafer carrier 26 holding the wafer 12, a chamber 28 with an upper opening and a compressible and flexible pad 16 having a polishing surface and fluid channels 24 placed between the upper opening and the face of the wafer, wherein the pad is configured to bow (flex) and apply more pressure near the center as the pressure in the chamber increases.

Regarding claim 32, Nagahara et al teach a manifold 22 which is a perforated and flexible support plate under the pad.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Nagahara et al (US 5,931,719) OR Nagahara et al (US 5,816,900) and in view of Landau (US 6,261,433).

The teachings of both Nagahara et al references are described above.

Neither Nagahara et al reference teaches adding a porous membrane in the chamber under the pad or support plate.

Landau teaches (see col. 13, lines 32-59) adding a porous ceramic barrier in a semiconductor processing apparatus for the purpose of ensuring that flow of fluid is uniform across the entire cross section.

Therefore, it would have been obvious to one of ordinary skill in the art to have added a porous membrane to the apparatus of Nagahara et al for the purpose of improving the uniformity of fluid flow across the entire cross section of the wafer.

11. Claims 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagahara et al (US 5,931,719) OR Nagahara et al (US 5,816,900).

The teachings of both Nagahara et al references are described above.

Neither Nagahara et al reference teaches adding a pressure sensor in fluid communication with the solution chamber.

However, since Nagahara et al teach (see col. 3, lines 21-31) that the pressure of the fluid in the chamber was varied and affected the pressure applied by polishing pad, one of ordinary skill in the art would have found it obvious to have added a pressure sensor and a flow rate controller (i.e.-a control valve) in order to control the pressure applied by the pad to the wafer.

12. Claims 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Nagahara et al (US 5,931,719) OR Nagahara et al (US 5,816,900) and in view of Liu et al (US 6,004,880).

The teachings of both Nagahara et al references are described above.

Neither Nagahara et al reference teaches using the apparatus for electrochemical mechanical deposition or polishing.

Liu et al teach (see abstract) a method of electrochemical mechanical deposition and simultaneous polishing of semiconductor wafers. This has the advantage of being only one step instead of multiple steps of electrochemical deposition followed by mechanical polishing.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the pad of Nagahara et al to be used in an electrochemical mechanical process as disclosed by Liu et al because integration of electrodes in a CMP apparatus allow for one step processing instead of two steps.

13. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oliver (US 5,876,271) in view of Maget (US 4,522,698).

Oliver teaches (see figures 3a, 3b, 6a and 6b and related discussion) an apparatus including a wafer carrier 310 holding a wafer 302, a chamber for supplying slurry to the wafer surface having an upper opening, and a compressible pad 306 placed between the upper opening of the chamber and the wafer surface.

However, Nagahara et al do not teach an apparatus wherein the upper opening of the chamber is defined by extendable side walls that expand and contract with respect to the pressure of the fluid in the chamber so that the pad applies a uniform pressure on the wafer surface.

Maget teaches (see figure 1 and col. 4, lines 1-10) adding a bellows structure 56 to the end of a chamber and an end plate 58. The bellows reacts by expanding and contracting in response to changes in the pressure of the fluid in the chamber. The rigid end plate is capable of pushing uniformly across its face.

Therefore, it would have been obvious to one of ordinary skill in the art to have added a bellows structure as taught by Maget to the end of the chamber of Oliver because the bellows structure would have allowed the polishing pad to apply a uniform pressure across the entire cross-section of the wafer. Oliver teaches (see col. 8, lines 17-29) a desire to maintain a uniform pressure across the polishing pad surface. Thus, by adding the bellows structure of Maget, the pressure would have been made more uniform.

Regarding claim 40, Oliver teaches (see figure 6a and related description) placing a stainless steel polishing diaphragm 606 which is perforated.

14. Claims 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oliver (US 5,876,271) in view of Maget (US 4,522,698) and further in view of Landau (US 6,261,433).

The teachings of Oliver and Maget are described above.

Neither Oliver nor Maget teach adding a porous membrane in the chamber under the pad or support plate.

Landau teaches (see col. 13, lines 32-59) adding a porous ceramic barrier in a semiconductor processing apparatus for the purpose of ensuring that flow of fluid is uniform across the entire cross section.

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Therefore, it would have been obvious to one of ordinary skill in the art to have added a porous membrane to the apparatus of Oliver for the purpose of improving the uniformity of fluid flow across the entire cross section of the wafer.

15. Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oliver (US 5,876,271) in view of Maget (US 4,522,698) and further in view of Liu et al (US 6,004,880).

The teachings of Oliver and Maget are described above.

Neither Oliver nor Maget teach using the apparatus for electrochemical mechanical deposition or polishing.

Liu et al teach (see abstract) a method of electrochemical mechanical deposition and simultaneous polishing of semiconductor wafers. This has the advantage of being only one step instead of multiple steps of electrochemical deposition followed by mechanical polishing.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the pad of Oliver to be used in an electrochemical mechanical process as disclosed by Liu et al because integration of electrodes in a CMP apparatus allow for one step processing instead of two steps.

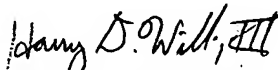
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10am-8:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Examiner
Art Unit 1742

hdw